COURSE TITLE: Foundations of Energy

UNIT TITLE: Building Management & Conservation

SECTION 1: General Information and Overview

Grade Level: 9-12

Suggested Number of Lessons: 5-7

Suggested Time to Complete Unit: 10-14 class periods

Unit Overview: This unit focuses on the building management, conservation management and audits of the building envelope and construction materials.

SECTION 2: Essential Questions

1.	What role does building materials have in reducing consumption?
2.	What role can students play in managing resources?
3.	Why is a building or home audit important to the energy portfolio?

SECTION 3: Major Focus

Technical Content CTE Program of Studies	Learner Activities (Enabling Knowledge and Skills/Processes)	Core Content For Assessment	Academic Expectations
Construction Technology KOSSA Standard AD-002: Demonstrate the ability to learn new processes and steps. **6.2**--Develop skills and competencies in the areas of energy. **6.2**--Identify ways to conserve energy.	Using the PDF files in the *Management and Conservation* unit, **research:** - current and new technologies in saving energy, -current energy trends and the impact on our nation's energy portfolio and economy.	**SC-HS-4.6.1** Students will: • explain the relationships and connections between matter, energy, living systems and the physical environment; • give examples of conservation of matter and energy. As matter and energy flow through different organizational levels (e.g., cells, organs, organisms, communities) and between living systems and the physical environment, chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the	**2.1** Students understand scientific ways of thinking and working and use those methods to solve real-life problems.

		environment as heat. Matter and energy are conserved in each change. **DOK 3**	
Construction Technology KOSSA Standard AD-003: Implement new processes given oral instructions. **2.3-5.5** Develop competencies in the safe and efficient use of the tools, machines, materials and processes of energy technology.	Using the NEED resource files on the CD *Future is Today*, **develop** a presentation on Plug Load Modeling and how to conduct energy audits.	**SC-HS-4.6.7** Students will: • explain real world applications of energy using information/data; • evaluate explanations of mechanical systems using current scientific knowledge about energy. The universe becomes less orderly and less organized over time. Thus, the overall effect is that energy is spread out uniformly. For example, in the operation of mechanical systems, the useful energy output is always less than the energy input; the difference appears as heat. **DOK 2**	**2.2** Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.
Construction Technology KOSSA Standard EA-005: Display initiative. **5.5**--Demonstrate and develop fundamental skill and knowledge of tools in the industry.	Using the resource CD and the Monitoring and Mentoring Kit, **explore and investigate** ways of saving energy at school and home. **Record** findings and **present** to class. **Conduct** an energy audit of the building. **Share** findings and suggestions with school officials.	**SC-HS-4.6.7** Students will: • explain real world applications of energy using information/data; • evaluate explanations of mechanical systems using current scientific knowledge about energy. The universe becomes less orderly and less organized over time. Thus, the overall effect is that energy is spread out uniformly. For example, in the operation of mechanical systems, the useful energy output is always less than the energy input; the difference appears as heat. **DOK 2**	**2.3** Students identify and analyze systems and the ways their components work together or affect each other
Construction Technology KOSSA Standard OC-002: Students will describe the appropriate application and use of	**Perform** classroom and home audits. **Share** results with class.	**SC-08-4.6.2** Students will: • describe or explain energy transfer and energy conservation; • evaluate alternative	**2.4** Students use the concept of scale and scientific models to explain the organization and functioning of living

measurement devices.		solutions to energy problems. Energy can be transferred in many ways, but it can neither be created nor destroyed. **DOK 3**	and nonliving things and predict other characteristics that might be observed.

SECTION 4: Culminating Project with Scoring Guide

Conduct district building audits using the Learn and Conserve Kit and the Monitoring and Mentoring Kit and present findings and suggestions to school officials.

SCORING GUIDE:

CATEGORY	4	3	2	1
CONTENT	EXTENSIVE- CONTENT BEYOND WHAT IS TAUGHT IN CLASS	GOOD- EXPLANANTION OF CONCEPTS COVERED IN CLASS	BASIC – WHAT HAS ALREADY BEEN COVERED IN CLASS	LIMITED- DOESN'T COVER MATERIAL AS WELL AS DONE IN CLASS
TECHNOLOGY	EXTENSIVE- POWER POINT WITH EXCELLENT ANIMATION AND PICTURES	APPROPRIATE- POWER POINT HAS SOME ANIMATION AND PICTURES	BASIC- POWER POINT WITH LITTLE ANIMATION AND PICTURES	LIMITED – POWER POINT WITH NO ANIMATION OR PICTURES
PRESENTATION	EXCELLENT- FLOWS WELL, AUDIENCE VERY ATTENTIVE- WELL REHEARSED	GOOD – FLOWS WELL PARTICIPANTS KNOW MATERIAL WELL	BASIC – FLOWS UNEVENLY MAY HAVE SOME READING OF NOTES OR SLIDES	LIMITED- PARTICIPANTS READ FROM NOTES OR SLIDES
INTEREST	EXTENSIVE – PARTICIPANTS MAKE MANY EXTENSIONS AND EXPLANATIONS	APPROPRIATE – ENCOURAGES QUESTIONS AND COMMENTS	BASIC – CAN FIELD SOME QUESTIONS	LIMITED – GLAD TO BE THROUGH WITH THE PRESENTATION

SECTION 5: Assessment and Enabling Skills and Processes

Assessment:	Students will design, build and evaluate ideas of an energy efficient house, use the energy house in the learning kit; make presentations to class and school officials using power point or some other technology; participate in conducting building audits and plug load surveys.

SECTION 6: Support Materials (i.e., Resources, Technology, and Equipment)

A. Resources	NEED Materials, M&M Kit, Solar Kit
B. Technology	Personal and shop tools and equipment
C. Websites (samples of many available)	WWW.NEED.ORG; WWW.DOE.Gov; WWW.EIA.GOV
D. Equipment	